

Queen Conch Stocking--Timing is Everything

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It is no surprise that Florida Keys residents take queen conch very seriously. Our namesake gastropod has a long history in the Keys, from the early years of fishing and shell collecting to Florida's complete ban on harvesting in 1986. Bob Glazer is one of several scientists throughout the region who is studying ways to bring queen conch populations back to pre-exploitation levels.

The queen conch (*Strombus gigas*) is a shelled gastropod belonging to the phylum Mollusca, which contains other invertebrate organisms such as clams, chitons, and octopii. Queen conch grow relatively slowly, and do not reach sexual maturity until 3.5 years of age, when their shells reach 180-270 mm in length and develop the characteristic flared lip. They live primarily along the offshore reef tract, in areas of coral rubble, coarse sand, and seagrass. An inshore population exists as well among sponges, algae, and mixed seagrasses.

A drastic reduction in the Key's queen conch population, due in part to intense fishing pressure, propelled fisheries managers into action years ago. A variety of methods may be used to enhance stocks of commercially and recreationally important species like the queen conch. Size and gear restrictions, bag limits, closed seasons, and zoned areas are common management methods used in Florida's marine waters. But what do managers do when a population has been depleted beyond the point of it being able to recover on its own? In these instances, placing hatchery-raised organisms in the wild to supplement natural populations may be the best solution.

But restocking queen conch to the wild is not as simple as it would seem. A variety of factors, such as predation and food availability, may be controlled in a laboratory setting where the conch are reared. However, these variables will greatly affect an organism's survival in natural habitats and must be considered prior to their release. Previous restocking research has concentrated on where to release juvenile conch - based on habitat, density of juveniles, and presence of wild conch. Bob Glazer, of DEP's Florida Marine Research Institute, recently completed a study which focused on the best timing for conch outplanting. "In order to maximize the survival of hatchery-raised conch released to the wild, we need to be concerned with not just where conch are being placed, but when that release occurs" said Glazer.



Marking queen conch with a wire identification tag is one way to track the survival of released individuals. Studies have shown that a queen conch with a metal tag is no more susceptible to being preyed upon than one with no tag at all.
(Photo: Florida Marine Research Institute)

Glazer's hypothesis was that juvenile conch released in the colder, winter months would fare better than those released during other seasons, due to the reduced feeding activity of the conch's predators during the winter. He also guessed that releasing conch prior to a new moon would increase their survival rates, since the darker ambient light conditions would make the conch harder to find by their predators.

In order to test these two predictions, Glazer and his team established experimental sites in the vicinity of Delta Shoals, off of Marathon. To ensure that the only factors being tested were season and lunar phase, each site was unified for overall size, water depth, habitat composition (which was mostly mixed seagrasses), and sediment size and type. Two mini-studies were also conducted prior to the main experiment. The first established that metal detectors, not visual censusing, provided the best method for finding tagged conch. The second study confirmed that juvenile conch with metal tags attached to them were no more susceptible to predation than untagged conch.

Juvenile conch that had been raised at the Keys Marine Laboratory on Long Key were divided into two size classes and released at the experimental sites.

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The beautiful shell of the queen conch grows in a spiral fashion as the animal develops, eventually flaring out to form the “pink” lip characteristic of this species. The soft body of a queen conch is called a “foot” because it is used in locomotion. Identification tags, such as the one shown on this individual, are usually attached to the shell with a thin wire.

(Photo: Florida Marine Research Institute)

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To study the effect of season on survival, 40 juveniles were released in April, July, and October, 1996, and in January 1997. The study sites were then surveyed every weekend for a period of ten weeks by Nature Conservancy volunteers, project assistants, and project biologist, Rich Jones. The lunar phase experiment involved the release of 20 juvenile conch of uniform size, prior to a new moon and full moon. These sites were surveyed daily for two weeks. For all trials, the data collected included the location, size, and condition of every individual found.

The results of both experiments disproved Glazer’s original hypotheses, and showed that juvenile conch “outplants” survived better when released in the fall and when their release was just before the full moon. Survivorship ranged from a low of 0% for small size classes during the spring season to a high of 49.7% for large juveniles in the fall. An additional finding was that conch over 75mm in length were more likely to survive. “Increased survival in the fall months may be attributed to reported declines in abundance of the conch’s major predators, the spiny lobster and loggerhead turtle, during that time of

year,” stated Glazer. And during the new moon, juvenile conch may be less likely to bury in the sediment and more likely to roam in search of food, therefore leaving themselves exposed to nocturnal predators.

Another benefit of Glazer’s project was the development of a model which estimates conch emigration and mortality. When trying to survey an organism that moves about freely, it is important to distinguish between individuals which have moved out of an area versus those that are missing due to predation and death. This model will certainly be useful to researchers for future population studies.

The results of this study, coupled with previous work done on factors affecting queen conch survival, is critical for successfully replenishing our famous Florida queen conch.

A copy of the report *Temporal Factors Influencing Survival of Hatchery-Raised Queen Conch Outplants*, by Robert Glazer and Richard Jones, may be obtained from the Florida Marine Research Institute’s Queen Conch Research Program at: (305) 289-2330. For more information about queen conch, visit: **www.floridamarine.org**.

Note: This article appeared in the Spring 98 issue of the newsletter of the Florida Keys National Marine Sanctuary, Sounding Line. For more information, visit: floridakeys.noaa.gov.

*The Florida Marine Research Institute is now part of Florida’s Fish and Wildlife Conservation Commission. For more information, visit: **www.floridamarine.org**.*